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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/519,350	07/14/2005	Kari Sundman	991.1203	3051
21831	7590	06/07/2007		
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NEW YORK, NY 10177				
			EXAMINER	
			FORTUNA, JOSE A	
			ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

<p align="center">Office Action Summary</p>	<p>Application No.</p> <p>10/519,350</p>	<p>Applicant(s)</p> <p>SUNDMAN ET AL.</p>	
	<p>Examiner</p> <p>José A. Fortuna</p>	<p>Art Unit</p> <p>1731</p>	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 February 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 and 7-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 7-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 1, the use of phrase/phrases such as, "especially for, for example, such as, etc." render the claim indefinite because it is unclear whether the limitation(s) following the phrase are part of the claimed invention. See MPEP § 2173.05(d). The metes and bounds of patent protection desired cannot be ascertained, i.e., what other process(es), besides the one indicated by the phrase "specially," in this particular case, is/are covered by the claims.

Claim Rejections - 35 USC § 103

2. Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brink et al (U.S. 3,639,111) in view of Hess et al (U.S. 3,607,619).

With respect to claim 1, Brink discloses a method for treatment of spent black liquor (col. 1, lines 54-61), in order to recover its contents of chemicals (col. 4, lines 18-28) and energy (col. 1, lines 54-61), wherein a spent liquor flow arriving from the evaporation plant (col. 5, lines 54-62) is taken to a pyrolysis reactor, wherein it is pyrolysed at a temperature of about 400°C to 750°C (col. 3, lines 3-12), which contains 2 specific points within the claimed range of 300-800°C, and the coke (i.e., "solid residue"; col. 3, lines 5-8) is taken to a gasification reactor for gasification (i.e., "cracking"; col. 3, lines 24-37), which gasification is implemented under such

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conditions that the sulphur compounds contained in the coke and deriving from the cooking chemicals are reduced to sodium sulphide (col. 2, lines 26-38). The Examiner construes Brink's lack of discussion of adding oxygen in the first zone to mean that the pyrolysis in the first zone occurs in the absence of an external gas component. Brink does not suggest introducing oxygen until the temperature is to be increased to the 800-1200°C range (i.e., gasification), which occurs in the second zone (col. 3, lines 24-37). At the time of the invention, it would have been obvious to a person of ordinary skill in the art that since the black liquor is derived from the Kraft process in the pulping of wood (col. 2, lines 26-32), this process would occur at a pulp mill.

Brink does not disclose expressly that the evaporable compounds are recovered before gasification.

Hess discloses a method for treatment of spent black liquor at a pulp mill (Abstract) wherein a spent liquor flow arriving from the evaporation plant (Detailed Description, ¶ 10) is taken to a pyrolysis reactor (Detailed Description, ¶ 4), wherein it is pyrolysed at a temperature of 450-700°F (converts to 232-371°C; Abstract), which contains 1 specific point (371) within the claimed range of 300-800°C, in the absence of an external gas component (Abstract) in order to separate evaporable compounds from the coke remaining in a solid state, whereupon the evaporable compounds (12) are recovered (Detailed Description ¶ 4), and the coke is burned to supply heat and to recover chemicals (Detailed Description ¶ 8).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to recover gases produced by pyrolysis as described by Hess in the pyrolysis and gasification process of Brink to obtain the invention as specified in claim 1.

The motivation would have been that the gaseous products of the process contain a substantial amount of dimethyl sulfide, which may be recovered as a valuable by-product of the process (Detailed Description ¶ 6).

With respect to claim 3, Brink discloses that the evaporable compounds separated from the spent liquor in the pyrolysis reactor are transferred to the gasification zone (col. 3, lines 5-8) and then are used at the mill as fuel (col. 4, lines 42-47).

With respect to claim 4, Hess discloses that the evaporable compounds separated from the spent liquor in the pyrolysis reactor are processed further (Detailed Description, ¶ 14).

With respect to claim 5, Brink discloses that the product gases resulting from the gasification are used at the mill as fuel (col. 4, lines 42-47).

With respect to claim 8, Hess discloses that the pyrolysis reactor is for a continuous process (col. 2, lines 64-67).

With respect to claim 7, Hess discloses that the reactor may be operated continuously (col. 2, lines 64-67), but does not require continuous operation. At the time of the invention, it would have been obvious to a person of ordinary skill in the art that batch operation is also appropriate for this process. It would have been further obvious, in absence of evidence to the contrary, that one of ordinary skill in the pyrolysis art would know what products would result at various temperature ranges and would select a temperature range to produce the product desired.

With respect to claim 9, Hess discloses that the pyrolysis is carried out in such process conditions (Brief Summary ¶ 8) wherein the Examiner construes that the evaporable compounds mainly consist of non-condensing gases (Detailed Description ¶ 13 & Table III), considering that Hess does not discuss any other evaporable compounds.

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Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brink and Hess as applied to claim 1 above, and further in view of Dehaas (U.S. 4,135,968).

With respect to claim 2, Brink and Hess do not disclose expressly that part of the liquor is burnt in a soda recovery boiler.

Dehaas discloses that a part of the spent liquor flow arriving from the evaporation plant is taken to the pyrolysis reactor (col. 5, lines 24-28), whereas a second part of the spent liquor flow is taken to a soda recovery boiler (col. 5, lines 22-23) where it is burnt in order to recover its contents of chemicals and energy (col. 1, lines 33-34).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to divide concentrated spent liquor for treatment by pyrolysis or by burning in a recovery boiler as described by Dehaas in the pyrolysis and gasification process of Brink and Hess to obtain the invention as specified in claim 2.

The motivation would have been to enable an increase in capacity and an improvement in efficiency of the boiler and effect a great reduction in the amount of particulate matter and odorous gases being carried away in flue gas (col. 3, lines 39-47).

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brink and Hess as applied to claim 1 above, and further in view of Purdy et al (U.S. 4,497,637) and Hermescec et al (U.S. 6,596,908).

With respect to claim 10, Brink and Hess do not disclose expressly producing pyrolysis oil. However, Brink discloses that the process is adapted to various organic wastes comprising wood, bark, agricultural residues, and municipal sanitary and solid wastes including garbage (i.e., biomass), in addition to Kraft black liquor (col. 1, lines 67-75).

Purdy discloses a method of pyrolyzing a biomass with inert gases, producing char, pyrolysis oil, and pyrolysis gas, and gasifying the char (Abstract) at a temperature of 900-1600°F (converts to 482-871°C; col. 5, lines 25-28), which contains one specific point within the claimed range of 300-800°C. Purdy does not disclose expressly that pyrolysis oil is the main constituent of the evaporable compounds.

Hermessec discloses a method of pyrolyzing lignocellulosic material (col. 1, lines 14-18), discloses that the relative product yield depends on process parameters (col. 1, lines 22-26), and that pyrolysis oil is the major product (i.e., the evaporable compounds mainly consist of pyrolysis oil) at temperatures between 350 and 600°C (col. 2, lines 4-6).

Brink, Hess, Purdy and Hermessec are analogous art because they are all directed to a similar problem solving area, that of pyrolyzing lignin-containing materials.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to expect pyrolysis gas production as described by Purdy and Hermessec in the pyrolysis and gasification process of Brink and Hess to obtain the invention as specified in claim 10.

The motivation would have been that the gas phase is the dominant pyrolysis product at temperatures in excess of 800°C (Hermessec, col. 1, line 66 – col. 2, line 1), which exceeds the claimed temperature range.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tournier et al (U.S. 4,511,433) in view of Hawley (Gessner G. Hawley, The Condensed Chemical Dictionary, Tenth Edition, Van Nostrand Reinhold Co., 1981).

With respect to claim 6, Tournier discloses a Method for treatment of spent liquor in which cooking is carried out with an organic solvent in order to recover its contents of chemicals

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(Abstract) and energy (col. 8, lines 46-53), wherein the spent liquor flow arriving from distillation (which the Examiner considers to be equivalent to an evaporation plant) is taken to a pyrolysis reactor (col. 8, lines 46-53), wherein it is pyrolysed at a temperature of 450°C (col. 12, lines 2-8), which contains 1 specific point within the claimed range of 300-800°C, under nitrogen (col. 12, lines 2-8), which the Examiner considers to be in the absence of an external gas component, in order to separate evaporable compounds from the coke remaining in a solid state (col. 12, lines 2-14), whereupon the evaporable compounds are recovered and used at the mill as process chemicals (col. 19, lines 17-19), and the coke is taken to combustion equipment for burning (col. 8, lines 46-53). At the time of the invention, it would have been obvious to a person of ordinary skill in the art that since the spent liquor is derived from the delignification of wood (col. 18, lines 53-57), this process would occur at a pulp mill.

Tournier does not disclose expressly that the phenolic compounds recovered were recovered from the evaporable compounds fraction remaining after pyrolysis. However, Tournier does disclose that the pyrolysis occurred at 450°C (col. 12, lines 2-8), which is higher than the boiling point of even high-boiling phenols as evidenced by Hawley (pg. 796, "phenol" entry). Therefore, the Examiner considers that the phenols from pyrolysis were evaporable at the high temperatures of pyrolysis.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to apply a boiling point range for phenols as described by Hawley in the delignification and pyrolysis method of Tournier to obtain the invention as specified in claim 6.

The motivation would have been that high-boiling phenols are used as solvents (col. 2, lines 18-23).

Response to Arguments

3. Applicant's arguments with respect to claims 1-5 and 6-10 have been considered but are moot in view of the new ground(s) of rejection.
4. Applicant's arguments filed on February 27, 2007 have been fully considered but they are not persuasive.

Applicants argue that the cited primary reference, Brink et al., does not teach the recovery of the evaporable compound and that this feature cannot be supplied by the secondary reference, Hess, because it would be against the teachings of the primary reference, i.e., Brink et al show that all the gases from the primary pyrolysis are passed to the secondary pyrolysis stages, i.e., gasification of the coke, to produce a clean gas. Also, applicants argue that if the gas is recovered in the first stage of Brink et al. invention, taking out such gases at that particular stage would contaminate the environment, which is against the teachings of the primary reference.

The examiner respectfully disagrees for the following reasons:

- Recovering of the gases at the first stage would not destroy the meaning of the primary reference, because the recovery of such gas does not imply the contamination of the environment, i.e., the gases do not go out to the environment, but they are recovered. Contamination cannot be read as synonym of recovery.
- The secondary reference, Hess, teaches the benefits of recovering the gases at this particular stage, see above, and therefore one of ordinary skill in the art would have the motivations and reasonable expectation of success if the gases are

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recovered at that particular, junction, e.g., the gaseous products of the process contain a substantial amount of dimethyl sulfide, which may be recovered as a valuable by-product of the process (Detailed Description ¶ 6). Note that it has been held that, “The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference.... Rather, the test is what the combined teachings of those references would have suggested to those of ordinary skill in the art.” In *re Keller*, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981). See also In *re Sneed*, 710 F.2d 1544, 1550, 218 USPQ 385, 389 (Fed. Cir. 1983) (“[I]t is not necessary that the inventions of the references be physically combinable to render obvious the invention under review.”); and In *re Nievelt*, 482 F.2d 965, 179 USPQ 224, 226 (CCPA 1973) (“Combining the teachings of references does not involve an ability to combine their specific structures.”).

- Examiner recognizes that references cannot be arbitrarily combined and that there must be some reason why one skilled in the art would be motivated to make the proposed combination of primary and secondary references. In *re Nomiya*, 184 USPQ 607 (CCPA 1975). However, there is no requirement that a motivation to make the modification be expressly articulated. The test for combining references is what the combination of disclosures taken as a whole would suggest to one of ordinary skill in the art. In *re McLaughlin*, 170 USPQ 209 (CCPA 1971). References are evaluated by what they suggest to one versed in the art, rather than by their specific disclosures. In *re Bozek*, 163 USPQ 545 (CCPA) 1969. In this

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case, one of ordinary skill in the art would have the motivations and reasonable expectation of success if the gases were recovered at that particular, junction, since the gaseous products of the process contain a substantial amount of dimethyl sulfide, which may be recovered as a valuable by-product of the process (Hess, Detailed Description ¶ 6).

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure in the art of "treatment of Spent Liquors at a Pulp Mill."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to José A. Fortuna whose telephone number is 571-272-1188. The examiner can normally be reached on 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven P. Griffin can be reached on 571-272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

A handwritten signature in black ink, appearing to read "José A. Fortuna", with a stylized flourish at the end.

José A Fortuna
Primary Examiner
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